

**Remarks**

Support for the above-requested amendments to claim 1 is found at least in paragraphs [0012], [0018], and [0022] and claim 8 as originally presented. Support for the amendments to claims 3 and 27 is found at least in paragraph [0022]. Support for the amendments to claims 28 and 38 is found at least in paragraph [0023]. Support for the amendments to claim 34 is found at least in paragraphs [0012], [0022], and [0024]. Support for new claims 39 and 41 is found at least in paragraph [0019]. New claim 40 is supported at least by paragraph [0022]. Claims 3, 7, 9, 20-24, 25, 29-31, and 36 have been amended for grammatical and/or formatting reasons and not for any reasons relating to patentability. Claim 33 has been amended to change the dependency of the claim. Claims 2, 8, and 37 have been canceled without prejudice. Claims 5-6, 10-19, and 35 were canceled without prejudice in previous Amendments. No question of new matter arises and entry of the above-requested amendments and new claims is respectfully requested.

Claims 1, 3-4, 7, 9, 20-34, 36, and 38-41 are before the Examiner for consideration.

**Formal Matter**

As shown above, Applicants have added new claims 39-40 by amendment (*i.e.*, three claims). Because the total number of claims Applicants are submitting for examination (*i.e.*, twenty-five claims) is not greater than the total number of claims previously presented and paid for (*i.e.*, twenty-five claims), Applicants respectfully submit that no additional filing fees are required for newly added claims 39-41. In addition, Applicants submit that because support for newly added claims 39-41 is found throughout the specification, as identified in the opening paragraph of the Remarks, these newly added claims do not contain any new matter.

**Examiner Interview**

Applicants wish to thank Examiner Fortuna for the courteous interview conducted on November 5, 2009. Applicants believe that the interview helped to advance the prosecution of this application.

During the interview, Applicants' representative discussed the Kempf and Sajbel references in view of the outstanding rejections under 35 U.S.C. §103(a). Applicants' representative also proposed claim amendments to remove the current rejections. The Examiner indicated

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that although a cursory review of the references seemed to confirm the arguments presented, a more detailed review of the references will need to be conducted prior to indicating any allowability of the claims. Applicants' representative also discussed the outstanding rejection under 35 U.S.C. §112, second paragraph, and indicated the proposed claim language for removing this rejection in the proposed claim amendments.

**Rejection under 35 U.S.C. §112, second paragraph**

Claims 1-4, 7-9, 20-34, and 36-38 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In particular, the Examiner asserts that it is unclear if the fibers in the phrase "subjecting the pulp fibers to a refining process" in claims 1 and 34 are the treated fibers or untreated fibers. Additionally, the Examiner asserts that the phrase "said solution" in claims 7 and 8 lack antecedent basis.

**Applicants' Response**

Initially, Applicants submit that claims 2, 8, and 37 have been canceled without prejudice, thereby rendering the rejection of these claims moot.

In response to the rejection of the remaining claims, Applicants have amended claim 1 to recite "subjecting the treated pulp fibers to a refining treatment to form refined paper making pulp fibers" and claim 34 to recite "refining the treated pulp fibers to form fibers having a modified morphology". Applicants submit that, as amended, it is clear that the treated pulp fibers are the fibers subjected to a refining treatment. Additionally, Applicants have amended claim 1 to recite that the softwood pulp fibers are subjected to a solution containing transitional metal ions and a peroxide. It is respectfully submitted that the solution recited in claim 1 provides proper antecedent basis for "said solution" in claim 7.

In view of the above, it is respectfully submitted that claims 1, 3-4, 7, 9, 20-34, 36, and 38 are sufficiently definite. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

**Rejection Under 35 U.S.C. §103(a)**

Claims 1-4, 7-9, 20-34, and 36-38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,410,397 to Kempf ("Kempf") in view of "Handbook for Pulp & Paper Technologies", 2<sup>nd</sup> Edition by Smook ("Smook"). In particular, the Examiner

asserts that Kempf teaches a process for treating pulp with peroxide and metal ion additives. It is also asserted that the process includes maintaining a pulp slurry at temperatures between 40 °C and 120 °C for 0.5 to 8 hours. Further, the Examiner asserts that a peroxide is added in an amount from 0.1 to 10% and that the pH is controlled between 1 and 7. The Examiner admits, however, that Kempf fails to teach a refining step after the peroxide treatment. In this regard, Smook is cited for assertedly teaching that it is well-known to refine pulp after the pulp has been treated in the pulping process in order to develop optimal papermaking properties with respect to the product being made. The Examiner concludes that refining the peroxide treated fibers of Kempf would have been obvious to one of skill in the art in view of Smook to optimize papermaking properties.

#### **Applicants' Response**

Initially, Applicants submit that claims 2, 8, and 37 have been canceled without prejudice, thereby rendering the rejection of these claims moot.

In response to the rejection of the remaining claims, Applicants respectfully direct the Examiner's attention to independent claims 1 and 34 and submit that claims 1 and 34 define methods for modulating the morphology of softwood fibers that are not taught or suggested within Kempf and Smook. Additionally, Applicants respectfully submit that Kempf and Smook do not teach or suggest the combination of features recited in claims 1 and 34.

Kempf teaches a peroxide-based solution and process for selectively delignifying and brightening lignocellulosic pulp. (*See, e.g.*, column 3, lines 10-13 and 45-47). The method avoids attacking the cellulosic portion of the pulp so as not to degrade the pulp and retard viscosity loss. (*See, e.g.*, column 3, lines 13-14 and 47-50). In the process of Kempf, an inorganic peroxide and a metal-containing additive whose metallic portion is selected from the group consisting of tin, titanium, and vanadium are included in the pulp slurry to delignify the lignocellulosic pulp. The inorganic peroxide may be used in an amount from about 0.1 to about 20% by weight based on O.D. pulp and the metal-containing additive may be used in an amount from about 0.1 to about 10% by weight based on O.D. pulp.

Kempf does not, however, teach or suggest a process that reduces fiber suspension viscosity as required by claims 1 and 34. Indeed, Kempf specifically teaches a process where peroxide is used to delignify and brighten lignocellulosic pulp and retard viscosity loss. (*See, e.g.*, column 3, lines 10-14 and 45-50). It is respectfully submitted that retarding viscosity

loss as taught by Kempf is very different from the methods claimed in claims 1 and 34 where the methods reduce fiber suspension viscosity. Applicants respectfully submit that there is simply no teaching or suggestion within Kempf of a method that reduces fiber suspension viscosity. In fact, it is respectfully submitted that Kempf teaches away from the claimed methods. Smook is silent regarding any teaching or suggestion of a method for modulating the morphology of softwood fibers that reduces fiber suspension viscosity, and as such, cannot make up for the deficiencies of Kempf. Moreover, it is respectfully submitted that even if the teachings of Smook were combined with the teachings of Kempf, the combination would not result in the presently claimed methods at least because Kempf specifically teaches retarding viscosity loss. Accordingly, Applicants submit that claims 1 and 34 are non-obvious and patentable.

In addition, Applicants submit that there is no motivation for one of skill in the art to arrive at a method for modulating the morphology of softwood fibers as claimed in claims 1 and 34 based on the disclosures of Kempf and Smook. In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. (*See, e.g., Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August 2008, §2143 citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007)).

Applicants respectfully submit that there is no teaching or suggestion within Kempf or Smook of a method for modulating the morphology of softwood fibers that includes (1) subjecting pulp containing softwood fibers to a solution containing transitional metal ions at a concentration from about 0.002% to about 0.1% by weight based on pulp and a peroxide at a pH of between about 1 and about 9 for a time from about 10 minutes to about 10 hours at a temperature of from about 40 to 120 °C and (2) subjecting the treated fibers to a refining treatment to form refined paper making fibers, where the method reduces fiber suspension viscosity as required by claim 1 or a method for modulating the morphology of softwood fibers that includes (1) adding transitional metal ions at a concentration from about 0.002% to about 0.1% by weight based on pulp to a solution comprising peroxide to form a metal-ion

activated peroxide, (2) contacting pulp including softwood fibers with the metal ion-activated peroxide at a pH of between about 1 and about 9 for a time from about 10 minutes to about 10 hours at a temperature from about 40 to 120 °C, and (3) refining the treated fibers to form fibers having a modified morphology, where the method reduces fiber suspension viscosity as claimed in claim 34 based on the teachings of Kempf and Smook because Kempf and Smook do not teach or even suggest a method that reduces fiber suspension viscosity. Indeed, it is respectfully submitted that Kempf teaches away from a method that reduces fiber suspension viscosity. Without some teaching or suggestion, there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness.

Further, Applicants submit that because Kempf and Smook do not teach or suggest a method for modulating the morphology of softwood fibers where the method reduces fibers suspension viscosity, Kempf and Smook, alone or in combination, fail to teach all of the claim limitations set forth in claims 1 and 34. Accordingly, it is submitted that a *prima facie* case of obviousness has not been established for this additional reason.

In view of the above, it is respectfully submitted that independent claims 1 and 34 are not taught or suggested by Kempf and Smook and that claims 1 and 34 are, therefore, non-obvious and patentable. With respect to dependent claims 3, 4, 7, 9, 20-33, 36, and 38, Applicants submit that because independent claims 1 and 34 are not taught or suggested by Kempf and Smook and claims 3, 4, 7, 9, 20-33, 36, and 38 are dependent upon claim 1 or claim 34 and contain the same elements as the claim from which they depend, dependent claims 3, 4, 7, 9, 20-33, 36, and 38 are also not taught or suggested by Kempf and/or Smook. In light of the above, Applicants submit that claims 1, 3, 4, 7, 9, 20-34, 36, and 38 are not obvious over Kempf in view of Smook and respectfully request reconsideration and withdrawal of this rejection.

#### **Rejection Under 35 U.S.C. §103(a)**

Claims 1-4, 7-9, 20-34, and 36-38 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,447,602 to Sajbel, *et al.* (“Sajbel”).<sup>1</sup> In particular, the

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<sup>1</sup> Applicants believe that the Examiner intended to reject claims 1-4, 7-9, 20-34, and 36-38 over Sajbel in view of Smook due to the inclusion of Smook in the written comments of the rejection bridging pages 5 and 6 of the Office Action dated August 7, 2009. In this regard, Applicants have treated Smook as being part of the Examiner’s rejection.

Examiner asserts that Sajbel teaches a process for repulping paper that contains a wet strength agent by adding a mixture of peroxide and a metal ion to the pulp. It is also asserted that the metal may be a metal such as iron, copper, and manganese. Additionally, the Examiner asserts that Sajbel teaches that the process is conducted at temperatures from 25 to 100 °C at a pH between 3 and 13. The Examiner admits, however, that Sajbel fails to teach a refining of the repulped paper.

In this regard, Smook is cited for assertedly teaching that it is well-known to refine pulp after the pulp has been treated in the pulping process in order to develop optimal papermaking properties with respect to the product being made. The Examiner concludes that refining the peroxide treated fibers of Sajbel would have been obvious to one of skill in the art in view of Smook to optimize their properties for papermaking.

#### **Applicants' Response**

Initially, Applicants submit that claims 2, 8, and 37 have been canceled without prejudice, thereby rendering the rejection of these claims moot.

In response to the rejection of the remaining claims, Applicants respectfully direct the Examiner's attention to independent claims 1 and 34 and submit that claims 1 and 34 define methods for modulating the morphology of softwood fibers that are not taught or suggested within Kempf and Smook. Additionally, Applicants respectfully submit that Kempf and Smook do not teach or suggest the combination of features recited in claims 1 and 34. Sajbel teaches a process for repulping wet-strength paper using at least one peroxide alone or in combination with a non-alkali, non-alkaline earth metal salt or metal chelate. (*See, e.g.*, column 1, lines 58-62). The peroxide compound is employed in an amount of at least 0.1% w/w based on the dry weight of the fiber in the slurry. (*See, e.g.*, column 2, lines 12-14). The metal salt or metal chelate may be used in an amount up to about 10 ppm. (*See, e.g.*, column 2, line 63 to column 3, line 6). Preferred metals are transition metals selected from the group consisting of iron, copper, cobalt, nickel, manganese, silver, titanium, cerium, lead, chromium, vanadium, molybdenum, tungsten, chromium, osmium, and selenium. (*See, e.g.*, column 2, lines 26-31).

Applicants submit that there is no teaching or suggestion within Sajbel of a process for modulating the morphology of softwood fibers where pulp including softwood fibers is

subjected to a solution containing a transitional metal ion at a concentration from about 0.002% to about 0.1% by weight based on pulp and a peroxide as required by claims 1 and 34. Sajbel simply does not teach or suggest the claimed amount of transitional metal ion, especially in a method for modulating softwood fibers. Indeed, Sajbel specifically teaches the inclusion of a metal salt or metal chelate in an amount up to about 10 ppm. It is respectfully submitted that Sajbel teaches an amount of a metal-containing compound that is very different from, and much less than, the transitional metal ion concentration claimed in claims 1 and 34.<sup>2</sup> Smook is silent regarding any teaching or suggestion of a solution containing a transitional metal ion at a concentration from about 0.002% to about 0.1% by weight based on pulp, and as such, cannot make up for the deficiencies of Sajbel. Accordingly, it is respectfully submitted that even if Sajbel was combined with Smook, the combination would not result in the methods of claims 1 and 34. Thus, Applicants respectfully submit that claims 1 and 34, and all claims dependent therefrom, are non-obvious and patentable.

Additionally, Applicants submit that the Examiner has failed to establish a proper *prima facie* case of obviousness. As discussed above, to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, and the prior art reference (or references when combined) must teach or suggest all the claim limitations. (See, e.g., *Manual of Patent Examining Procedure*, Patent Publishing, LLC, Eighth Ed., Rev. 7, August 2008, §2143 citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007)).

Applicants submit that there is no teaching or suggestion within Kempf of a method for modulating the morphology of softwood pulp fibers that includes (1) subjecting pulp containing softwood fibers to a solution containing transitional metal ions at a concentration from about 0.002% to about 0.1% by weight based on pulp and a peroxide at a pH of between about 1 and about 9 for a time from about 10 minutes to about 10 hours at a temperature of from about 40 to 120 °C and (2) subjecting the treated fibers to a refining treatment to form refined paper making fibers, where the method reduces fiber suspension viscosity as required by claim 1 or a method for modulating the morphology of softwood fibers that includes (1)

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<sup>2</sup> It is respectfully submitted that 1 ppm = 0.0001% by weight.

adding transitional metal ions at a concentration from about 0.002% to about 0.1% by weight based on pulp to a solution comprising peroxide to form a metal-ion activated peroxide, (2) contacting pulp including softwood fibers with the metal ion-activated peroxide at a pH of between about 1 and about 9 for a time from about 10 minutes to about 10 hours at a temperature from about 40 to 120 °C, and (3) refining the treated fibers to form fibers having a modified morphology, where the method reduces fiber suspension viscosity as claimed in claim 34 based on the teachings of Sajbel and Smook because Sajbel and Smook do not teach or even suggest a solution containing a transitional metal ion at a concentration from about 0.002% to about 0.1% by weight based on pulp and a peroxide as claimed in claims 1 and 34. Without some teaching or suggestion, there can be no motivation, and without motivation, there can be no *prima facie* case of obviousness.

Also, as discussed above, Sajbel and Smook do not teach or suggest a process for modulating the morphology of softwood fibers where the pulp is subjected to a solution containing a transitional metal ion at a concentration from about 0.002% to about 0.1% by weight based on pulp and a peroxide. Therefore, Applicants respectfully submit that Sajbel and Smook, alone or in combination, fail to teach all of the claim limitations set forth in claims 1 and 34. Accordingly, it is respectfully submitted that a *prima facie* case of obviousness has not been established for this additional reason.

In view of the above, it is respectfully submitted that independent claims 1 and 34 are not taught or suggested by Sajbel and Smook and that claims 1 and 34 are, therefore, non-obvious and patentable. With respect to dependent claims 3, 4, 7, 9, 20-33, 36, and 38, Applicants submit that because independent claims 1 and 34 are not taught or suggested by Sajbel and Smook and claims 3, 4, 7, 9, 20-33, 36, and 38 are dependent upon claim 1 or claim 34 and contain the same elements as the claim from which they depend, dependent claims 3, 4, 7, 9, 20-33, 36, and 38 are also not taught or suggested by Sajbel and/or Smook. In light of the above, Applicants submit that claims 1, 3, 4, 7, 9, 20-25, 27-34, 36, and 38 are not obvious over Sajbel and Smook and earnestly request that this rejection be reconsidered and withdrawn.



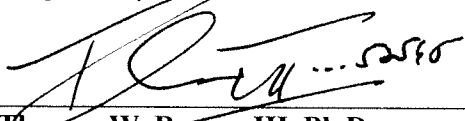
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**Conclusion**

In light of the above, Applicants believe that this application is now in condition for allowance and therefore request favorable consideration.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge the amount of **\$0.00** required for the request for extension of time to our Deposit Account No. 09-0525. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 09-0525. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time.

Correspondence Client Number: <b>01726</b>  (513) 248-6736 (phone) (513) 248-6455 (fax)	Respectfully Submitted,	
		
	<b>Thomas W. Barnes III, Ph.D.</b>	
	Registration No.	<b>52,595</b>